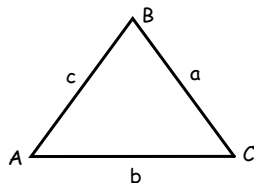


4.4 The Cosine Law

For any acute triangle the Cosine law is true:

To find a side:



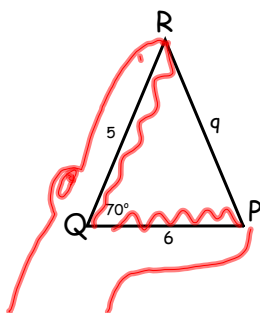
$$a^2 = b^2 + c^2 - 2bc \cos A$$

Match side and angle

$$c^2 = a^2 + b^2 - 2ab \cos C$$

$$b^2 = a^2 + c^2 - 2ac \cos B$$

Ex 1: Find q



$$q^2 = p^2 + r^2 - 2pr \cos Q$$

$$q^2 = 5^2 + 6^2 - 2(5)(6) \cos 70^\circ$$

$$\sqrt{q^2} = \sqrt{40.4787914}$$

$$q = 6.4$$

Apr 5-3:11 PM

What if you need to find an angle?

$$a^2 = b^2 + c^2 - 2bc \cos A$$

$$\frac{2bc \cos A}{2bc} = \frac{b^2 + c^2 - a^2}{2bc}$$

$$\cos A = \frac{b^2 + c^2 - a^2}{2bc}$$

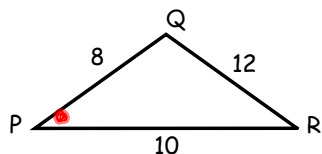
$$A = \cos^{-1} \left[\frac{b^2 + c^2 - a^2}{2bc} \right]$$

Then to find an angle use:

Match side and angle

$$\cos A = \frac{b^2 + c^2 - a^2}{2bc}$$

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Ex 2: Find $\angle P$ 

$$\cos P = \frac{q^2 + r^2 - p^2}{2qr}$$

$$\cos P = \frac{10^2 + 8^2 - (12)^2}{2(10)(8)}$$

$$\cos P = \frac{20}{160}$$

$$P = \cos^{-1}\left(\frac{20}{160}\right)$$

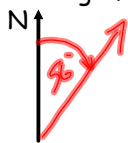
$$P = 73^\circ$$

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Get your bearings.....

The bearing angle:

- is the angle between the magnetic North and the direction of travel, clockwise direction.

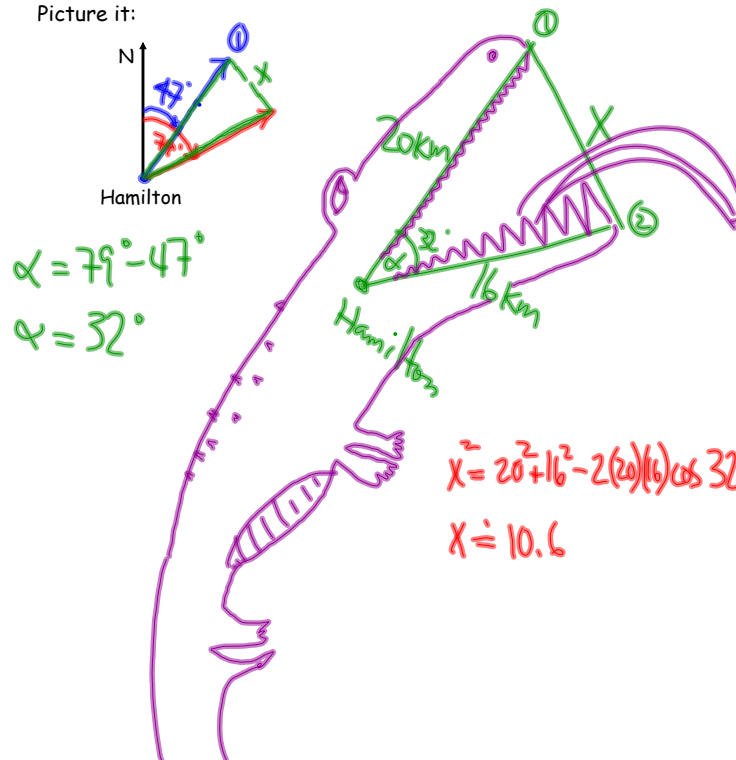
a) bearing of 56° b) bearing of 120° c) bearing of 320° 

Apr 5-8:57 PM

Ex 3:

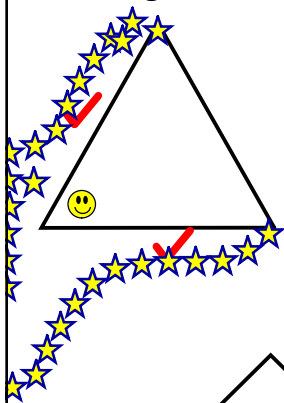
Two boats left the Hamilton Harbour at the same time. One traveled with the speed of 10 km/h on a bearing of 47° , another traveled at 8 km/h on a bearing of 79° . How far apart are the boats after 2 hours?

Picture it:

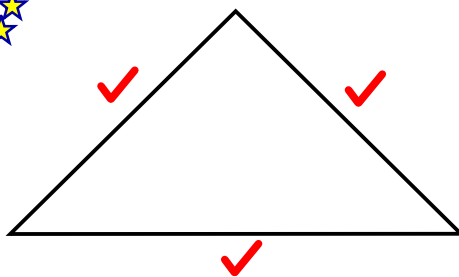


Apr 5-9:04 PM

We use the Cosine Law to solve an oblique triangle when we are given:



-two sides and the contained angle



- three sides of a triangle

Apr 8-9:11 AM

Hmwk
p 299 # 2, 3, 5ad, 7, 9



Oct 29-3:08 PM